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of a number of other factors than the two the author describes so well, as for instance, the general level of knowledge, the conditions of general religious belief, the conceptions of justice, the social and economic conditions shaping the desires for improved conditions in this life, in the form of a national kingdom or social reform, and perhaps many others. If one thinks of a belief in immortality as shaped by specific factors, the lack of continuity (if indeed this be proven) between primitive views and modern views breaking a certain evolutionary progress, does not assume such theoretical importance.

William F. Ogburn

Arboreal Man. F. Wood Jones, M.B., D.Sc., Professor of Anatomy in the University of London. Longmans, Green and Co.: New York, 1916. Pp. x, 230, 81 figs. (Price $2.40 net.)

Recent literature on the evolution of man has dealt chiefly with the changes brought about by the assumption of the upright gait. In *Arboreal Man* the effects of the erect posture have been a secondary consideration as compared to the influence of early life among the trees.

Evolution is assumed as a fact and all attempts at explaining the methods by which changes of structure came into being, were perfected, and handed down, are wisely disclaimed at the outset. The author defines his position by saying that change has been effected somehow, and somehow such changes have been inherited. Nevertheless if one does not partially accept the principle of "use and disuse" the arguments lose much of their force. Dr. Jones says (p. 6):

> Man comes from an arboreal stock. Two questions arise. When in the phylogeny of Mammals did this stock become arboreal and when did it give rise to a creature which we could possibly term human? The first question is capable of an approximate solution, the second is unanswerable, but we may say with regard to it that, if the term "humanoid" may be permitted, such a stock may have had a very early representation among the mammalian fauna.

As used and undefined by the author the term "humanoid" can lead only to confusion. If we regard it as a synonym of "primate" the answer will probably pass unchallenged. If, on the other hand, we regard it as a synonym of "anthropoid" or, as seems more justifiable, we take it to mean the more immediate ancestors of man, many paleontologists and anatomists will take exception. While the early separation of man from the remainder of the anthropoid stock is always a possibility, paleontological evidence at present does not justify an earlier separation than Miocene.

Mammals which become terrestrial sacrifice the amphibian and reptilian mobility of the limbs for stability in order to gain support for the body and facility of locomotion. This mobility once lost is never fully regained. Much is made of these facts in answering the question, when in the phylogeny of mammals did the "humanoid" stock become arboreal? In the anthropoid apes and more especially in man, we have the retention of this primitive mobility in the greatest degree. Only a very early arboreal life could prevent this member from becoming sacrificed to stability. Accordingly the ancestry of man is taken back to the Cynodont Therapsids (Reptiles) of the Triassic and Permian of South Africa. Here a scene comparable to that enacted by the climbing tailed Amphibians or Tree Frogs is depicted.

That the forelimb of Man and the Anthropoids represents a primitive condition in respect to mobility, number of digits, power of supination and rotation most anatomists will grant. But the view that for this reason, or any other reasons so far brought forward, the ancestry of man, in exclusion of the rest of the mammalia, must be pushed back into the very "dawn" of mammalian evolution will meet with some opposition. The alternative is that the generalized ancestor of all Metatherian and Eutherian mammals was very probably arboreal or sub-arboreal and had just these same characters of mobility of the arm and fore-arm as seen in Man and the Anthropoids. There is much evidence in support of this view. Adopting this theory we avoid the necessity for early separation of the Anthropoids from the remainder of the Mammals and Man from the Anthropoids. Nor do some of us see the necessity of deriving the generalized Mammal from an amphibious form as described above.

While demonstrating the anatomical primitiveness of the human forelimb Dr. Jones takes occasion to decry the ever present tendency to insinuate that in man we find the culminating form of evolution and perfected type. In reference to the brain this is true but in regard to other anatomical structures, such as limbs, the horse may justly claim this distinction.

One of the best chapters in the book is that on the "Human Foot" (p. 73). Some of the praise which has been lavished on the hand is transferred to the foot.

> If man should wish to point with pride to any organ the structure of which definitely severs him from all the other existing Primates, it is to the foot that he should point. If missing links are to be tracked successfully, the foot, far more than the skull or teeth will mark him as the Monkey or the Man.

It is most certainly true that this phase of Anthropology has been subordinated, perhaps necessarily. Man inherited an arboreal foot in which the middle digit was probably longest. Arboreal life had developed the hallux as a grasping member. Since becoming terrestrial man has paralleled the Horse in progressing towards a stage with a greatly reduced pes. That the small toe is a fast degenerating member no one can doubt. It is also true that the central axis of the foot as determined by the grouping of the interossei muscles has changed from the middle to the second digit. That such a change is possible is shown by the partly terrestrial Gorilla in which the central axis is variable, being sometimes the second and sometimes the third digit.

Hand feeding and the preparation of food have successfully conditioned the retraction of the snout region and a reduction in dentition. The newly acquired chin is regarded as a retrogressive character in modern man. If this can be conclusively proven it will be the final blow to the much doubted association of a certain type of chin with speech or a highly differentiated genio-glossus muscle.

One or more chapters are devoted to each organ or system of organs. Arboreal life has left its stamp on the vertebrae, pelvis, viscera and especially the respiratory system. The difficulties of locomotion in such a habitat has reduced the number of offspring among Primates. For those who are inclined to interpret Embryology in the terms of Phylogeny there is an interesting chapter on the "Human Baby" (p. 201).

One of the closing chapters deals with the failures of arboreal life. Among these are the Lemurs and Sloths, which became too highly adapted to arboreal life to change. Man's salvation and success are due to the fact that he was early arboreal but did not become a highly specialized arboreal form.

It is not to be expected in the present state of our knowledge that anyone would wholly agree with Dr. Jones and in some few cases it is to be doubted whether he would get a majority to agree with him. Taken as a whole, it is one of the best zoological treatments of man that has appeared. One thing especially commends it. It deals with evolution as a present-day process and not wholly confined to the past ages. The author's ability as a teacher is shown by the remarkably clear and interesting presentation of some complicated anatomical problems. It is in every sense a readable book and none of the evidences advanced can be passed over lightly.

LOUIS R. SULLIVAN